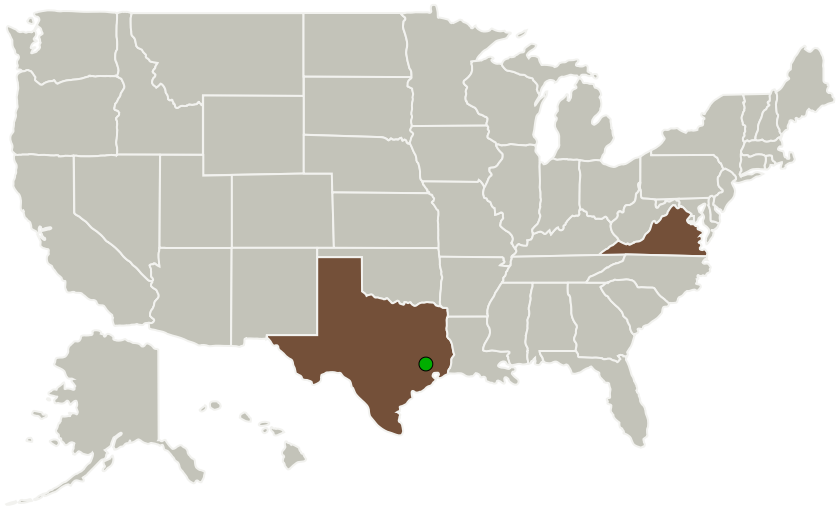
Next Generation, Lightweight, Durable Boot Materials to Provide Active & Passive Thermal Protection, Phase I

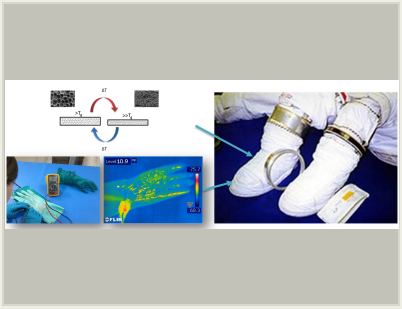
Completed Technology Project (2014 - 2014)

Project Introduction

The objective of this NASA Phase I SBIR program is to leverage lightweight, durable materials developed by NanoSonic for use within extra vehicular activity (EVA) space boots to provide the following benefits: weight reduction, increased durability/longevity and thermal protection/comfort. NanoSonic will collaborate with ILC Dover, the manufacturer of the EVA space boot, to develop next-generation designs employing the adaptive thermal control materials described herein. Next-generation designs will increase the comfort and productivity while reducing fatigue and injury risks provided to crew members. Further, these next-generation EVA boot materials shall also provide enhanced instep support and enable better boot sizing as indexing. To address the comfort and thermal concerns within the EVA boot, NanoSonic will work with ILC Dover, the world's leader in EVA spacesuits, who was recently awarded the contract by NASA to develop the Z-2 advanced spacesuit. In addition to providing enhancements for foot indexing and thermal comfort, NanoSonic will work with ILC to ensure that the solutions developed herein provide weight savings and increased durability such that the EVA prototype boots developed in the Phase II effort will afford crew members increased comfort and productivity while reducing fatigue and injury risk. The proposed program would start at TRL 5 and end at TRL 8 after a Phase II effort.

Primary U.S. Work Locations and Key Partners





Next Generation , Lightweight, Durable Boot Materials to Provide Active & Passive Thermal Protection Project Image

Table of Contents

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Organizations Performing Work	Role	Type	Location
Nanosonic, Inc.	Lead Organization	Industry	Pembroke, Virginia
Johnson Space Center(JSC)	Supporting Organization	NASA Center	Houston, Texas

Primary U.S. Work Locations	
Texas	Virginia

Project Transitions

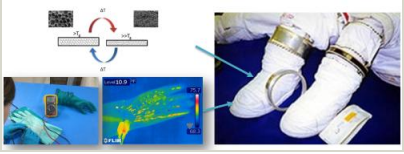
June 2014: Project Start

December 2014: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138357)*

Images



Project Image
Next Generation , Lightweight, Durable Boot Materials to Provide Active & Passive Thermal Protection Project Image
(https://techport.nasa.gov/image/134932)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Nanosonic, Inc.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

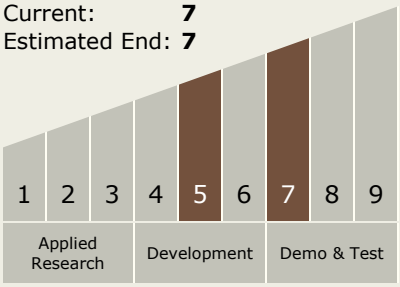
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Sandberg Lianne

Technology Maturity (TRL)

Start: **5**
Current: **7**
Estimated End: **7**



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Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.2 Extravehicular Activity Systems
    - TX06.2.1 Pressure Garment

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System